

**The interaction between self-care behavior and disease knowledge on the decline
in renal function in chronic kidney disease**

Yi-Chun Tsai^{1-5#}, Shu-Li Wang^{6#}, Hui-Ju Tsai⁷, Tzu-Hui Chen⁶, Lan-Fang Kung⁶, Pei-Ni Hsiao⁶, Shih-Ming Hsiao⁶, Shang-Jyh Hwang^{1,3,4}, Hung-Chun Chen^{1,3,4}, Yi-Wen Chiu^{1,3,4*}

¹Department of Nephrology, Department of Internal Medicine, Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan

²Division of General Medicine, Department of Internal Medicine, Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan

³Faculty of Renal Care, Kaohsiung Medical University, Kaohsiung, Taiwan

⁴School of Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan

⁵Cohort Research Center, Kaohsiung Medical University, Kaohsiung, Taiwan.

⁶Department of Nursing, Kaohsiung Medical University Hospital, Kaohsiung Medical University

⁷Department of Family Medicine, Kaohsiung Municipal Ta-Tung Hospital, Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung, Taiwan

Table S1. The risk for rapid eGFR decline (eGFR decline more than 3ml/min/1.73m²/year) within one year prior to questionnaire examination in study patients in univariate logistic analysis

	Univariate	
	OR(95%CI)	p-value
Clinical characteristics		
Age (year)	0.99(0.97-1.00)	0.1
Sex (male, %)	1.10(0.74-1.62)	0.6
Smoking (yes, %)	1.35(0.85-2.14)	0.2
Alcohol consumption (yes, %)	0.53(0.26-1.10)	0.1
Hypertension (yes, %)	1.41(0.80-2.47)	0.2
Diabetes mellitus (yes, %)	1.55(1.03-2.30)	0.03
Heart disease (yes, %)	1.20(0.73-1.95)	0.4
ACEI/ARB (yes, %)	0.79(0.52-1.22)	0.3
Marital status (yes, %)	0.91(0.57-1.44)	0.7
Currently working (yes, %)	1.21(0.79-1.86)	0.4
Independent finances (yes, %)	1.20(0.81-1.79)	0.4
Education (high school or above, %)	0.93(0.63-1.39)	0.7
Body mass index (kg/m ²)	1.01(0.96-1.05)	0.8
Blood urea nitrogen (mg/dl)	1.01(0.99-1.01)	0.3
eGFR (ml/min/1.73m ²)	0.99(0.98-0.99)	0.02
Log-formed glycated hemoglobin	1.11(0.91-1.35)	0.3
Hemoglobin (g/dl)	0.87(0.79-0.96)	0.008
Albumin (g/dl)	0.82(0.48-1.40)	0.5
Uric acid (mg/dl)	1.05(0.93-1.19)	0.4
Cholesterol (mg/dl)	1.00(0.99-1.01)	0.3
Log-formed triglyceride	1.59(0.69-3.65)	0.3
Log-formed urine protein/creatinine ratio	1.84(1.29-2.62)	0.01
Self-care behavior (per score)	0.97(0.95-0.99)	0.001
Disease knowledge (per score)	0.93(0.89-0.96)	<0.001

Table S2. The adjusted risks for rapid eGFR decline (eGFR decline more than 3ml/min/1.73m²/year) within one year prior to questionnaire examination in study patients according to self-care behavior and disease knowledge scores using forward analysis

	Rapid eGFR decline	
	Adjusted Odds ratio (95% CI)	p-value
Self-care behavior (per score)	0.97(0.95-0.99)	0.003
Self-care behavior (Quartiles)		
Quartile 1	Reference	
Quartile 2	0.74(0.43-1.28)	0.3
Quartile 3	0.57(0.33-0.98)	0.04
Quartile 4	0.42(0.30-0.77)	0.005
Disease knowledge (per score)	0.92(0.88-0.95)	<0.001
Disease knowledge (Quartiles)		
Quartile 1	Reference	
Quartile 2	0.73(0.41-1.29)	0.3
Quartile 3	0.48(0.27-0.83)	0.009
Quartile 4	0.32(0.17-0.59)	<0.001
Low self-care score & low disease knowledge score	Reference	
High self-care score & low disease knowledge score	0.76(0.43-1.33)	0.3
Low self-care score & high disease knowledge score	0.68(0.39-1.19)	0.2
High self-care score & high disease knowledge score	0.33(0.19-0.58)	<0.001

Forward analysis was adjusted for all variables in Table 1

Self-care score quartile cut at 59, 67 and 72.

Disease knowledge score quartile cut at 18, 22 and 25

Low self-care as less than median of self-care score; High self-care as above median of self-care score

Low disease knowledge as less than median of disease knowledge score; High disease knowledge as above median of disease knowledge score

Table S3. The adjusted risks for rapid eGFR decline (eGFR decline more than 3ml/min/1.73m²/year) within two years prior to questionnaire examination in study patients according to self-care behavior and disease knowledge scores

	eGFR slope ml/min/1.73m ² /year	Portion of eGFR decline more than 3ml/min/1.73m ² /year	Rapid eGFR decline	
			Adjusted Odds ratio (95% CI)	p-value
Self-care behavior (per score)	-2.0 (-4.3,0.0)	167/454 (36.8)	0.97(0.95-0.99)	0.005
Self-care behavior (Quartiles)				
Quartile 1	-2.5(-5.3,-0.5)	58/125 (46.4)	Reference	
Quartile 2	-2.0(-4.0,0.3)	39/107 (36.4)	0.73(0.42-1.27)	0.3
Quartile 3	-1.7(-4.3,0.3)	42/126 (33.3)	0.60(0.35-1.04)	0.1
Quartile 4	-2.0(-3.6,0.1)	28/96 (29.2)	0.47(0.26-0.85)	0.01
Disease knowledge (per score)	-1.8(-1.2,0.1)	167/454 (36.8)	0.95(0.91-0.98)	0.006
Disease knowledge (Quartiles)				
Quartile 1	-2.2(-4.9,-0.0)	61/138 (44.2)	Reference	
Quartile 2	-2.1(-4.4,0.3)	31/90 (34.4)	0.73(0.41-1.32)	0.3
Quartile 3	-1.9(-3.9,-0.1)	44/120 (36.7)	0.76(0.44-1.31)	0.3
Quartile 4	-1.6(-3.8,0.1)	31/106 (29.2)	0.43(0.23-0.79)	0.007
Low self-care score & low disease knowledge score	-2.3(-5.1,-0.3)	59/133 (44.4)	Reference	
High self-care score & low disease knowledge score	-2.0(-4.5,0.7)	33/95 (34.7)	0.75(0.42-1.32)	0.3
Low self-care score & high disease knowledge score	-2.2(-4.3,-0.0)	38/99 (38.4)	0.85(0.48-1.50)	0.5
High self-care score & high disease knowledge score	-1.6(-3.5,0.0)	37/127 (29.1)	0.48(0.28-0.83)	0.01

Adjusted for age, sex and all variables in Table 1 whose p-value were <0.05 (age, sex, diabetes mellitus, hemoglobin, baseline estimated glomerular filtration rate, and log-formed urine protein-creatinine ratio) in unadjusted model.

Self-care score quartile cut at 59, 67 and 72.

Disease knowledge score quartile cut at 18, 22 and 25

Table S4. The distribution of five subscales of self-care behavior in study patients stratified by the medians levels of self-care behavior and disease knowledge

Self-care	Entire Cohort N=454	Low self-care score & low disease knowledge score N=133	High self-care score & low disease knowledge score N=95	Low self-care score & high disease knowledge score N=99	High self-care score & high disease knowledge score N=127	p-value
Total scores	64.1±9.7	55.3±7.0 ^{#&}	71.6±3.9 ^{*&}	58.0±6.7 ^{*#}	72.5±4.0 ^{*&}	<0.001
Medication adherence	23.5±2.8	22.5±3.2 [#]	24.5±1.3 ^{*&}	22.5±3.7 [#]	24.5±1.2 ^{*&}	<0.001
Diet control	14.6±3.5	12.0±3.0 ^{#&}	16.6±2.5 ^{*&}	12.9±2.8 ^{*#}	17.1±2.4 ^{*&}	<0.001
Exercise	10.0±4.2	6.4±3.2 ^{#&}	13.4±2.1 ^{*&}	7.8±3.4 ^{*#}	13.1±2.3 ^{*&}	<0.001
Smoking behavior	9.1±2.1	8.8±2.3 [#]	9.7±1.0 ^{*&}	8.2±2.9 [#]	9.5±1.5 ^{*&}	<0.001
Blood pressure monitoring	6.8±2.6	5.7±2.5 [#]	7.3±2.6 [*]	6.4±2.5	7.9±2.3 ^{*&}	<0.001

Data are expressed as number (percentage) for categorical variables and mean±SD

Low self-care as less than median of self-care score (67); High self-care as above median of self-care score (67)

Low disease knowledge as less than median of disease knowledge score (22); High disease knowledge as above median of disease knowledge score (22)

**P* < 0.05 compared with low self-care score & low disease knowledge score; #*P* < 0.05 compared with high self-care score & low disease knowledge score; &*P* < 0.05 compared with low self-care score & high disease knowledge score

Table S5. Distributions of sex, age, and chronic kidney disease (CKD) stages between subjects with questionnaire measurement and those without questionnaire measurement

	Cohort of CKD care program (n = 1405)	Questionnaire group (n = 470)	Non-questionnaire group (n = 935)	p-value
Age (years)				
< 60	24.8	26.2	24.2	0.4
≥ 60	75.2	73.8	75.8	
Sex				0.02
male	60.1	55.7	62.2	
Female	39.9	44.3	37.8	
CKD stage				0.1
1-3a	25.0	25.7	24.6	
3b	24.1	20.4	26.0	
4	27.3	28.3	26.8	
5	23.6	25.5	22.6	

Stage 1: eGFR ≥ 90; stage 2: eGFR 60-89; stage 3a: eGFR 45-59; stage 3b: eGFR 30-44; stage 4: eGFR 15-29; stage 5: eGFR < 15 ml/min/1.73m²